

ENGINEERING SERVICES, REGION X  
CODES & INTERPRETATIONS COMMITTEE  
REVIEW SUMMARY

- REFERENCE: ES letter to Fort Belknap Community Council (FBCC) dated February 13, 1998, regarding final inspection and beneficial occupancy.
- ISSUE: Clarification of requirements for automatic sprinkler protection in attic spaces.
- LOCATION: Hays Health Center, Hay, MT, and Fort Belknap Infirmary, Harlem, MT
- BACKGROUND: Both facilities are single story buildings over a crawl space. The building structure is steel columns and beams with open-web steel joist framing for the floor and roof; the floor is concrete over steel decking; the roof is steel decking; and the ceiling is suspended acoustical tile or gypsum wallboard. The building construction is classified as Type II (000). The main floor only is fully sprinklered; the attic and crawl space are not sprinklered. The sloped roof creates a very large attic housing major mechanical equipment. There is one access to the attic at Hays Health Center via an inclined ladder and platform in the Boiler/Mechanical Room with a 20-minute fire-rated door through a 1-hour fire resistive wall (per construction documents). There are two accesses to the attic at Ft. Belknap Infirmary, one via an inclined ladder and platform in the Boiler/Mechanical Room with a 20-minute fire-rated door through a 1-hour fire resistive wall (per construction documents), and one via an inclined ladder and platform in the Electrical Room. At Ft. Belknap Infirmary the Electrical Room with the attic access is open to the attic above. Catwalks provide access throughout the attic and range in width from 1.7 meters to 2.8 meters at Hays Health Center and from 1.6 meters to 1.9 meters at Ft. Belknap Infirmary. There is one section of catwalk that is 6.5 meters by 7.0 meters at Ft. Belknap. The Hays Health Center was designed as a New Ambulatory Health Care Facility. The Ft. Belknap Infirmary was designed as a New Ambulatory Health Care Facility for the outpatient clinic with a 2-hour occupancy separation from the infirmary designed as New Hospital. (NFPA 101, Chapter 12, 1994 edition.) The occupancy separation extends through the attic space. The two attic accesses are separated from each other by a 2-hour separation. The construction documents called for both buildings to have full automatic sprinkler protection including the attic space (specification section 15300, paragraph 1.4(A)). The Fire Protection Subcontractor's submittal did not include sprinklers in the attic space. When questioned by the Architect reviewing the submittals for FBCC, the subcontractor indicated that sprinklers were not required by NFPA 13 *Standard for the Installation of Sprinkler Systems* when the building is noncombustible construction. Based on this analysis the Architect approved the submittal without sprinklers in the attic. During the final inspection at Ft. Belknap Infirmary, the ES team questioned the unsprinklered attic space given the easy accessibility, volume of the space, and potential to utilize as storage.
- DISCUSSION NFPA 101, *Life Safety Code*, 12-3.5.1 requires a hospital to be "protected throughout by an approved, supervised automatic sprinkler system." Type of construction is not a factor in assessing whether health care facilities are sprinklered except for ambulatory health care centers. NFPA 101, 12-6.1.6 does not require an ambulatory health care center one story in height and of Type II (000) construction to be sprinklered. However, it has been the practice in the recent past to sprinkler all IHS health care facilities. An ambulatory health care center protected throughout by an automatic sprinkler system allows certain exceptions from other

requirements such as separation at boiler rooms. The reference standard for the installation of sprinkler systems, whether mandatory or not, is NFPA 13 *Standard for the Installation of Sprinkler Systems*.

NFPA 13, 4-1.1 (1994 edition) requires "sprinklers installed throughout the premises". Exception No. 1 allows certain exceptions from the requirement for sprinklers throughout for concealed spaces, vertical shafts and dwelling units.

Buildings may have concealed spaces behind walls, above suspended ceilings, in utility chases, behind soffits, under computer floors, in attics. NFPA *Fire Protection Handbook* (Seventeenth edition) notes fire in concealed spaces is a major concern because of the ability for a fire to burn undetected for an extended period. Furthermore, access to concealed spaces is often more difficult impacting the ability to fight a fire once detected. Combustible concealed spaces, such as attics, are a particularly severe hazard, where fire can spread undetected until it burns through the floor or roof above or causes parts of the ceiling below to drop. Noncombustible concealed spaces are seldom a fire hazard unless the space contains combustible materials.

NFPA 13, 4-5.1 (1994 edition) specifically addresses concealed spaces and requires sprinklers whenever concealed spaces are "...enclosed wholly or partly by exposed combustible construction..." Several exceptions are provided based on size of space. In addition, two exceptions are provided based on materials in concealed spaces:

*Exposed surfaces with a flame spread rating of 25 or less, and  
Exposed combustible insulation with a heat content of the facing and substrate  
of 1000 Btu per square foot.*

The *Automatic Sprinkler Systems Handbook* (1996 edition) for NFPA 13 clarifies the intent of the code is that sprinklers are not required if a concealed space is constructed of noncombustible materials, has no combustible surfaces and/or materials, and has no storage or occupancy. Several cited formal interpretations clarify further that use of a concealed space, such as an attic or interstitial space, for storage or the introduction of combustibles into such spaces requires automatic sprinklers, irrespective of whether the construction of the space is noncombustible. However, the *Handbook* also clearly articulates that "...minor quantities of combustible materials, such as communication wiring,...should not typically be viewed as requiring sprinklers." In assessing minor quantity each situation needs to be addressed on an individual basis, however, the *Handbook* includes various examples and interpretations for specific situations to provide guidance to the Authority Having Jurisdiction (AHJ). The *Handbook* in discussing the requirements for sprinklers in concealed spaces further elaborates that "the existence of an access to a concealed space could lead to the space being used for storage or other purposes."

In reviewing previous editions of the *Automatic Sprinkler Systems Handbook*, the same interpretations have consistently appeared in the text. This is atypical for

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NFPA Codes and Standards, most of which incorporate interpretations as code language in the subsequent edition after issuance of the original interpretation. We can only assume the intent was to grant the AHJ discretion in applying the requirements for sprinklering in specific situations.

In evaluating whether a concealed space must have automatic sprinkler protection to meet the intent of the code, three questions must be asked:

Is the concealed space constructed of noncombustible materials?

If, no - then requires sprinklers; if, yes - then answer second question.

Are there combustible materials or combustible surfaces in the concealed space?

If, yes and more than minor quantity - then requires sprinklers; if no - then answer third question.

Is there storage or other use in the concealed space?

If, yes - then requires sprinklers; if no - then does not require sprinklers.

Although attics are often considered concealed spaces, as discussed in the NFPA *Fire Protection Handbook* (Seventeenth edition) and *Automatic Sprinkler Systems Handbook* (1996 edition), the construction of the attic envelope and its use must first be evaluated before assuming an attic is a concealed space.

INTERPRETATION: In evaluating the Hays Health Center and Ft. Belknap Infirmary, both attics have been designed to be easily accessible. At Ft. Belknap Infirmary, one section of the attic is open to the space(s) below (Electrical Room). Therefore, that portion of the attic at Ft. Belknap Infirmary open to the space(s) below and separated from the remainder of the facility by continuous 2-hour separation walls is not considered concealed space, and must have automatic sprinkler protection. The remaining attic space at Ft. Belknap Infirmary and the entire attic at Hays Health Center appear to meet the definition of concealed spaces.

In applying the criteria for determining the sprinkler protection requirement in concealed spaces specifically to the Hays Health Center and the Ft. Belknap Infirmary, the attics in both facilities are clearly constructed of noncombustible materials. Furthermore, materials and surfaces presently in the space are noncombustible, meet the exceptions cited in NFPA 13, or are of a minor quantity, resulting in very limited fire loads. Finally, there currently is no storage or other use in the concealed space. Therefore, the attic at Hays Health Center and the portion(s) of the attic at Ft. Belknap Infirmary considered concealed spaces do not require sprinkler protection.

**This interpretation applies only to the facilities noted herein and is valid so long as the current conditions exist.** Because of the easy accessibility to the attics, the extensive catwalk system currently in the attics, and the overall volume of the space, there is great potential for misuse of the space as storage or other use in the future. The introduction of combustible materials into the space or the use of the

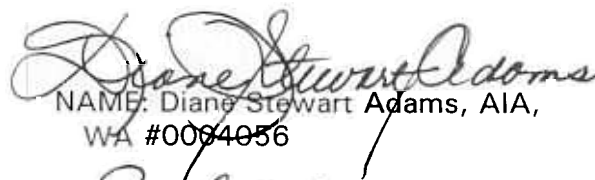
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space for storage or other use will necessitate the installation of full automatic sprinkler protection.

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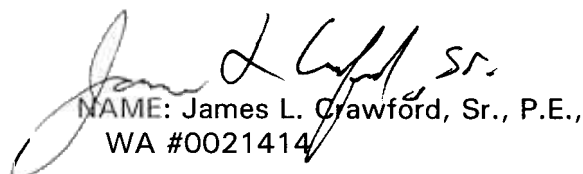
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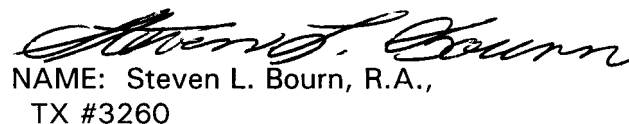
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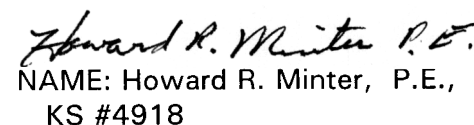
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